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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/783,499	02/20/2004	George Gustave Zipfel JR.	Zipfel I	7599
EXAMINER				
SHINGLETON, MICHAEL B				
ART UNIT			PAPER NUMBER	
2817				

DATE MAILED: 03/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/783,499

Applicant(s)

ZIPFEL ET AL.

Examiner

Michael B. Shingleton

Art Unit

2817

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-42,52-58 and 63-69 is/are pending in the application.
- 4a) Of the above claim(s) 12, 18, 27-29, 40, 52-58 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-11, 13-17, 19-26, 30-39, 41, 42, and 63-69 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7-26-04 onesled

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Michael B. Shingleton
MICHAEL B. SHINGLETON
PRIMARY EXAMINER
RECEIVED INVENTOR 17

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-7, 9-11, 13-17, 19, 21-23, 30, 31, 34, 35 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prokin et al. 6,985,034 (Prokin).

At least Figures 12, 15 and 16 along with the relevant text of Prokin discloses a switching amplifier arrangement. The following describes the claimed invention with respect to mainly Figure 15 of Prokin so as to avoid repeating statements on the same subject matter, however, applicant should note that other Figures of Prokin will meet the claimed the claimed invention. Accordingly these interpretations are part of the instant rejection as well.

Many if not most of the claims of the instant application are not specific on structure but are narrative in nature involving a description of how the invention is to work rather than positively specifying the structure which goes up to make the device. For example the switching amplifier is "adapted" to drive loads with first and second switching signals, yet there is no clear or positive structure recited of the amplifier that produces these first and second switching signals (See MPEP 701). The claim language is of such breath that the amplifier structure can act as a conduit for these first and second switching signals and does not produce these signals. The claims are in accordance very broad and not considered indefinite. With this in mind the structure of Figure 15 of Prokin is almost identical to the structure shown in Figures 4a and 4b of the disclosed invention, as well as the claimed invention, except for the use of a common mode inductor that "prevents common-mode signals" (See page 15 of the instant application.). Furthermore the same function is recited in Prokin. Applicant attributes the net baseband current of the two loads to be approximately zero due to the push-pull nature of the arrangement. Column 2, around line 66 of Prokin relates to this same push-pull nature and Prokin also recites in column 8 how the baseband, i.e. the modulated current component, is to have opposite directions and are identical and cancel each other out.

Note specifically that elements 31 and 32 of Prokin forms a first switching arrangement exactly like that of elements 65 and 77, or 35 and 47 of applicant's invention. This first switching arrangement

forms the first switching signal and has a switching frequency and a modulated or baseband component. Elements 33 and 324 of Prokin forms a second switching arrangement exactly like that of elements 67 and 85, or 37 and 55 of applicant's invention. This second switching arrangement forms a second switching signal that has a switching frequency and a modulated or baseband component. Elements 51 and 52 are the two reactive loads that are driven by the two switching signals just like the loads L1 and L2 of applicant's invention. In particular note the connection of 51 to the node between 31 and 32 which is the same as the L1 connection between elements 65 and 77 (Figure 4B), 35 and 47 (Figure 4A) of applicant's invention. In particular also note the connection of 52 to the node between 33 and 34 which is the same as the L2 connection between elements 67 and 85 (Figure 4B), 37 and 55 of the disclosed invention. In addition to that above Prokin also discloses the use of a filter composed of inductors 41 and 42 that are connected in the same manner as the filter inductors 39 and 43 of applicant's invention.

Thus because the Prokin reference has the same structure connected in the same manner as that of applicant's invention, the claimed functional or narrative statements that includes the statements like: "said loads being interconnected in such a way that, the sum of the values of the currents through said each load is substantially constant", "substantially all of said at least one baseband component of said first switching signal being a current that flows into said first reactive load and substantially all of said at least one baseband component of said second switching signal being a current that flows into said second reactive load", "said loads being interconnected in such a way that, substantially all of the current at baseband frequencies flowing out of one or more of said loads at a given time flows into one or more of the others of said loads", "said baseband components are such that said currents add to zero at substantially all times". "said two loads have substantially equal impedances and wherein the baseband components of said first and second switching signals are of substantially equal magnitude and are substantially the inverse of one another", "applying said first and second switching signals to said first and second signal paths, respectively, in such a way that at least one switching band component of said first switching signal and at least one switching band component of said second switching signal cancel each other and therefore are substantially isolated from said loads", "alternating polarity currents flow in said second path in response to said second switching signal", "said at least one switching band component of said first switching signal and said at least one switching band component of said second switching signal are of substantially the amplitude and phase", "the baseband signals being such that substantially all of the current at baseband frequencies flowing out of one or more of said loads at a given time flows into one or more of the others of said loads, and such that substantially all of the current at baseband frequencies flowing in said two or more circuit paths flows through the respective reactive load", "said

first and second switching signals having respective fundamental switching components that are of substantially equal magnitude and phase so as that they are canceled by said common-mode inductor, said first and second switching signals each further having at least one respective baseband component, the baseband components of said first and second switching signals being such that substantially all of the current at baseband frequencies flowing out of one or more of said transducers at a given time flows into one or more of the others of said loads", "wherein the phases and amplitudes of said baseband components are such that said currents add to zero at substantially all times", "wherein said transducers have substantially equal impedance and wherein said baseband components are the inverse of one another", "wherein said current flowing out of one or more of said transducers flows away from said power supply terminal and said current flowing into one or more of the others of said transducers flows toward said power supply terminal", "wherein there are two of said transducers having substantially equal impedances and wherein the baseband components of said first and second switching signals are of substantially equal magnitude and are substantially the inverse of one another" are clearly met by Prokin. However, selecting the component values is well known to affect the values of the currents, voltages, etc. of that circuit. It would have been well within one of routine skill to adjust these result effective variables so as to obtain the workable range for the circuit as recited above. Thus while Prokin does not use the exact language as applicant does to describe the workable range of the device of Prokin, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjusted the values of the components of Prokin so as to ensure the functional language as noted above is provided, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art.

In addition to that above the loads of Prokin do form at least one transducer as elements 51 and 52 are voice coils (See column 8, around line 22.). Also note that the common node of the loads of Prokin is connected to the DC voltage source 1 in the same manner that the common node of the loads L1 and L2 are connected to the DC voltage source V_1 . In addition with respect to claims like claim 23, here the first and second signals are generated in response to pulse width modulated signals. Again the claim is narrative and does not recite a positive limitation to the structure that must provide the pulse width modulated signals, however, note that PWM1 and PWM3 of Prokin are pulse width modulated signals. Thus Prokin has the structure necessary to generate these signals.

Applicant should note that while claims 12 and 18 are withdrawn, applicant's attention is directed toward Figures like Figure 13, and 16 of Prokin.

Claims 1, 3-7, 9-11, 13-17, 19, 21-23, 30, 31, 34, 35 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prokin et al. WO 01/01554 (Prokin Foreign).

At least Figures 12, 15 and 16 along with the relevant text of Prokin Foreign discloses a switching amplifier arrangement. The following describes the claimed invention with respect to mainly Figure 15 of Prokin Foreign so as to avoid repeating statements on the same subject matter, however, Applicant should note that other Figures of Prokin Foreign will meet the claimed the claimed invention. Accordingly these interpretations are part of the instant rejection as well.

Many if not most of the claims of the instant application are not specific on structure but are narrative in nature involving a description of how the invention is to work rather than positively specifying the structure which goes up to make the device. For example the switching amplifier is "adapted" to drive loads with first and second switching signals, yet there is no clear or positive structure recited of the amplifier that produces these first and second switching signals (See MPEP 701). The claim language is of such breath that the amplifier structure can act as a conduit for these first and second switching signals and does not produce these signals. The claims are in accordance very broad and not considered indefinite. With this in mind the structure of Figure 15 of Prokin Foreign is almost identical to the structure shown in Figures 4a and 4b of the disclosed invention, as well as the claimed invention, except for the use of a common mode inductor that "prevents common-mode signals" (See page 15 of the instant application.). Furthermore the same function is recited in Prokin Foreign. Applicant attributes the net baseband current of the two loads to be approximately zero due to the push-pull nature of the arrangement. Page 3 around line 20 of Prokin Foreign relates to this same push-pull nature and Prokin Foreign also recites on Page 20 how the baseband components, i.e. the modulated current component, are to have opposite directions and are identical and cancel each other out.

Note specifically that elements 31 and 32 of Prokin Foreign forms a first switching arrangement exactly like that of elements 65 and 77, or 35 and 47 of applicant's invention. This first switching arrangement forms the first switching signal and has a switching frequency and a modulated or baseband component. Elements 33 and 34 of Prokin Foreign forms a second switching arrangement exactly like that of elements 67 and 85, or 37 and 55 of applicant's invention. This second switching arrangement forms a second switching signal that has a switching frequency and a modulated or baseband component. Elements 51 and 52 are the two reactive loads that are driven by the two switching signals just like the loads L1 and L2 of applicant's invention. In particular note the connection of 51 to the node between 31 and 32 which is the same as the L1 connection between elements 65 and 77 (Figure 4B), 35 and 47

(Figure 4A) of applicant's invention. In particular also note the connection of 52 to the node between 33 and 34 which is the same as the L2 connection between elements 67 and 85 (Figure 4B), 37 and 55 of the disclosed invention. In addition to that above Prokin Foreign also discloses the use of a filter composed of inductors 41 and 42 that are connected in the same manner as the filter inductors 39 and 43 of applicant's invention.

Thus because the Prokin Foreign reference has the same structure connected in the same manner as that of applicant's invention, the claimed functional or narrative statements that includes the statements like: "said loads being interconnected in such a way that, the sum of the values of the currents through said each load is substantially constant"; "substantially all of said at least one baseband component of said first switching signal being a current that flows into said first reactive load and substantially all of said at least one baseband component of said second switching signal being a current that flows into said second reactive load", "said loads being interconnected in such a way that, substantially all of the current at baseband frequencies flowing out of one or more of said loads at a given time flows into one or more of the others of said loads", "said baseband components are such that said currents add to zero at substantially all times". "said two loads have substantially equal impedances and wherein the baseband components of said first and second switching signals are of substantially equal magnitude and are substantially the inverse of one another", "applying said first and second switching signals to said first and second signal paths, respectively, in such a way that at least one switching band component of said first switching signal and at least one switching band component of said second switching signal cancel each other and therefore are substantially isolated from said loads", "alternating polarity currents flow in said second path in response to said second switching signal", "said at least one switching band component of said first switching signal and said at least one switching band component of said second switching signal are of substantially the amplitude and phase", "the baseband signals being such that substantially all of the current at baseband frequencies flowing out of one or more of said loads at a given time flows into one or more of the others of said loads, and such that substantially all of the current at baseband frequencies flowing in said two or more circuit paths flows through the respective reactive load", "said first and second switching signals having respective fundamental switching components that are of substantially equal magnitude and phase so as that they are canceled by said common-mode inductor, said first and second switching signals each further having at least one respective baseband component, the baseband components of said first and second switching signals being such that substantially all of the current at baseband frequencies flowing out of one or more of said transducers at a given time flows into one or more of the others of said loads", "wherein the phases and amplitudes of said baseband

components are such that said currents add to zero at substantially all times”, “wherein said transducers have substantially equal impedance and wherein said baseband components are the inverse of one another”, “wherein said current flowing out of one or more of said transducers flows away from said power supply terminal and said current flowing into one or more of the others of said transducers flows toward said power supply terminal”, “wherein there are two of said transducers having substantially equal impedances and wherein the baseband components of said first and second switching signals are of substantially equal magnitude and are substantially the inverse of one another” are clearly met by Prokin Foreign. However, selecting the component values is well known to affect the values of the currents, voltages, etc. of that circuit. It would have been well within one of routine skill to adjust these result effective variables so as to obtain the workable range for the circuit as recited above. Thus while Prokin Foreign does not use the exact language as applicant does to describe the workable range of the device of Prokin Foreign, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjusted the values of the components of Prokin Foreign so as to ensure the functional language as noted above is provided, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art.

In addition to that above the loads of Prokin Foreign do form at least one transducer as elements 51 and 52 are voice coils (See page 12, around line 17.). Also note that the common node of the loads of Prokin Foreign is connected to the DC voltage source 1 in the same manner that the common node of the loads L1 and L2 are connected to the DC voltage source V_1 . In addition with respect to claims like claim 23, here the first and second signals are generated in response to pulse width modulated signals. Again the claim is narrative and does not recite a positive limitation to the structure that must provide the pulse width modulated signals, however, note that PWM1 and PWM3 of Prokin Foreign are pulse width modulated signals. Thus Prokin Foreign has the structure necessary to generate these signals.

Applicant should note that while claims 12 and 18 are withdrawn, applicant's attention is directed toward Figures like Figure 13, and 16 of Prokin Foreign.

Claims 8, 20 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prokin et al. 6,985,034 (Prokin) or Prokin et al. WO 01/01554 (Prokin Foreign) as applied to claims 1, 3-7, 9-11, 13-17, 19, 21-23, 30, 31, 34, 35 and 41 above, and further in view of Ogushwitz 5,235,559 (Ogushwitz).

Both Prokin and Prokin Foreign discloses the basic amplifier structure as claimed in claims 8, 20 and 42. In particular note the rejection of claims 1, 3-7, 9-11, 13-17, 19, 21-23, 30, 31, 34, 35 and 41 involving Prokin and Prokin Foreign as the reasoning presented therein applies here. Prokin and Prokin Foreign lacks the mentioning of the transducer for acoustic sonar uses i.e. Prokin and Prokin Foreign is

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silent on the structure being such that it can transmit sound waves underwater. However, the use of a speaker underwater otherwise known as a "sonar transducer" along with the necessary structure to allow this use is conventionally known in the art. (See column 4, around line of Ogushwitz). Note that any generated acoustic wave generated underwater would be a "sonar" signal. No structure of receiving or calculating the received signal is recited by the claims nor is any such structure implied.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize in the arrangement of Prokin or Prokin Foreign in an underwater environment because as the Prokin and Prokin Foreign references are silent on the exact construction of the transducers 51 and 52 one of ordinary skill in the art would have been motivated to use any art-recognized equivalent transducer such as the one taught by Ogushwitz. One of ordinary skill would have been further motivated to have modified the structure of Prokin or Prokin Foreign so as to allow for the use of a speaker underwater as taught by Ogushwitz.

Claims 24-26, 32, 33, 36-39 and 63-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prokin et al. 6,985,034 (Prokin) or Prokin et al. WO 01/01554 (Prokin Foreign) as applied to claims 1, 3-7, 9-11, 13-17, 19, 21-23, 30, 31, 34, 35 and 41 above, and further in view of Sawashi 6,653,897 (Sawashi).

Both Prokin and Prokin Foreign discloses the basic amplifier structure as claimed in claims 24-26, 32, 33, 36-39 and 63-68. These claims however, recite or are related to the provision of providing a common-mode inductor so that the common mode involving the switching frequency is cancelled. Such is common-place in a switching amplifier that has the same basic structure of that of Prokin and Prokin Foreign as noted by element 34A and 34B of Figure 3 of Sawashi. Also noted the paragraph bridging columns 3 and 4 of Sawashi.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provided a common-mode inductor in Prokin and Prokin Foreign so as to filter out the common-mode component as taught by Sawashi.

Claim 69 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prokin et al. 6,985,034 (Prokin) or Prokin et al. WO 01/01554 (Prokin Foreign), and ~~WO~~ as applied to claims 1, 3-7, 9-11, 13-17, 19, 21-26, 30-39, 41, and 63-68 above, and further in view of Ogushwitz 5,235,559 (Ogushwitz).

Prokin and Prokin Foreign lacks the mentioning of the transducer for acoustic sonar uses i.e. Prokin and Prokin Foreign is silent on the structure being such that it can transmit sound waves underwater. However, the use of a speaker underwater otherwise known as a "sonar transducer" along with the necessary structure to allow this use is conventionally known in the art. (See column 4, around

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line of Ogushwitz). Note that any generated acoustic wave generated underwater would be a "sonar" signal. No structure of receiving or calculating the received signal is recited by the claims nor is any such structure implied.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize in the arrangement of Prokin or Prokin Foreign in an underwater environment because as the Prokin and Prokin Foreign references are silent on the exact construction of the transducers 51 and 52 one of ordinary skill in the art would have been motivated to use any art-recognized equivalent transducer such as the one taught by Ogushwitz. One of ordinary skill would have been further motivated to have modified the structure of Prokin or Prokin Foreign so as to allow for the use of a speaker underwater as taught by Ogushwitz.

Conclusion

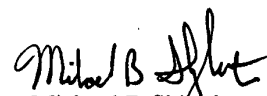
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fukushima 6,967,527 and Stengel 5,442,317 shows the basic full bridge amplifier arrangement for a speaker. Fujita 6,961,438 and Mieda et al. 6,229,387 shows that the use of two or more series connected speakers can take the place of a single speaker. Thus Fukushima 6,967,527 or Stengel 5,442,317 could form the primary reference in a 35 USC 103 rejection where the Fujita 6,961,438 or Mieda et al. 6,229,387 could form the secondary reference in a 35 USC 103 rejection where the replacement of the single speaker of the primary reference with a series connected arrangement would have been obvious. This possibly could meet some of the claims of the instant application. However, such a rejection was not made so as to avoid the multiplicity of rejections.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. Shingleton whose telephone number is (571) 272-1770.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal, can be reached on (571) 272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306 and after July 15, 2005 the fax number will be 571-273-8300. Note that old fax number (703-872-9306) will be service until September 15, 2005.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MBS
March 17, 2006


Michael B Shingleton

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Primary Examiner
Group Art Unit 2817